

What is claimed is:

1. A positioning apparatus, comprising:

a support surface (1a) of a first block (1), supporting a surface (2a) to be supported of a second block (2);

a central pillar (11) projecting from the support surface (1a) toward a leading end, and fixed to the first block (1);

an engaging member (12) inserted into an engaging hole (3) opened in the surface (2a) to be supported, and supported onto the first block (1) in an outer peripheral space of the central pillar (11);

a wedge space (W) narrowing in one axial direction, and arranged between the central pillar (11) and the engaging member (12);

a wedge member (15) inserted into the wedge space (W), and configured to be axially movable therein; and

said wedge member (15) configured to be axially movable by a driving device (31).

2. The positioning apparatus as set forth in claim 1, wherein,

said engaging member is composed of an annular elastic sleeve (12).

3. The positioning apparatus as set forth in claim 1, including

an annular plug (121) inserted into said engaging hole (3) is arranged on a outer periphery of the wedge member (15); and

said engaging member is composed of a plurality of pressing members (12)

arranged circumferentially at intervals,

    said pressing members (12) is supported onto a peripheral wall (121a) of the annular plug (121) configured to be radially movable,

    said pressing members (12) is configured to be movable radially inward by a restoring device (122).

4. A positioning apparatus, comprising:

    a support surface (1a) of a first block (1), supporting a surface (2a) to be supported of a second block (2);

    a central pillar (11) projecting from the support surface (1a) toward a leading end, and fixed to the first block (1);

    an elastic sleeve (12) fitting to an engaging hole (3) opened in the surface (2a) to be supported, and supported onto the first block (1) in an outer peripheral space of the central pillar (11);

    a wedge space (W) narrowing in one axial direction, and arranged between the central pillar (11) and the elastic sleeve (12);

    a wedge member (15) inserted into the wedge space (W), and configured to be axially movable therein; and

    a driving device (31) for moving the wedge member (15) axially provided in the first block (1).

5. The positioning apparatus as set forth in claim 1, wherein

    said central pillar (11) is formed integrally with the first block (1).

6. The positioning apparatus as set forth in claim 1, including
  - a ceiling wall (27) on the central pillar (11), covering a leading end portion of said wedge space (W).
7. The positioning apparatus as set forth in claim 2, including
  - a ceiling wall (27) on the central pillar (11), covering a leading end portion of the wedge space (W); and
    - a leading end surface of the elastic sleeve (12) is supported onto the ceiling wall (27) and configured to be radially movable thereon,
    - a base end surface of the elastic sleeve (12) is supported onto a supporting portion (9b) of the first block (1) and configured to be radially movable thereon.
8. The positioning apparatus as set forth in claim 1, wherein
  - a plurality of said wedge spaces (W) are arranged circumferentially at predetermined intervals,
  - a plurality of said wedge members (15) are inserted into the respective wedge spaces (W),
    - each of the wedge members (15) includes a wedge surface (19) in a leading end portion, and an input portion (20) in a base end portion, and
      - the input portion (20) is connected to an output portion (44) of the driving device (31) and configured to be movable radially relatively.
9. The positioning apparatus as set forth in claim 1, wherein
  - said wedge space (W) is formed in an annular shape.

10. The positioning apparatus as set forth in claim 9, wherein  
said wedge member (15) is composed of an annular collet and configured to  
be radially expansible by its elastic restoring force.

11. The positioning apparatus as set forth in claim 8, wherein  
both said wedge space (W) and said wedge member (15) are formed in such a  
manner as to narrow toward the base end.

12. The positioning apparatus as set forth in claim 8, wherein  
both said wedge space (W) and said wedge member (15) are formed in such a  
manner as to narrow toward the leading end.

13. The positioning apparatus as set forth in claim 11, including  
a plurality of inclined grooves (17) inclined toward the leading end on the  
outer periphery of the central pillar (11).

14. The positioning apparatus as set forth in claim 11, including  
either a tapered surface (55) narrowing toward the leading end or a plurality of  
inclined surfaces inclined toward the leading end, on the outer periphery of the central  
pillar (11).

15. The positioning apparatus as set forth in claim 11, wherein  
the engaging member (12) includes a tapered surface narrowing toward the  
base end on the inner periphery thereof.

16. The positioning apparatus as set forth in claim 12, wherein  
the engaging member (12) includes a tapered surface narrowing toward the

leading end on the inner periphery thereof.

17. The positioning apparatus as set forth in claim 2, wherein

    said elastic sleeve (12) is composed of a thin-walled cylinder formed integrally in a circumferentially seamless manner,

    an annular wall (12c) of the elastic sleeve (12) includes a plurality of radially expandible portions (51), which are arranged circumferentially at intervals thereon and configured to be elastically deformable radially outward and restorable radially inward by their own elastic restoring force.

18. The positioning apparatus as set forth in claim 2, including

    a slit (74) or at least one through groove (76) in the peripheral wall of the elastic sleeve (12); and

    the elastic sleeve (12) is configured to be radially contractible by its own elastic restoring force.

19. The positioning apparatus as set forth in claim 18, including

    an elastic sealing member (75) made of rubber or synthetic resin, etc., disposed in the slit (74) or the through groove (76).

20. The positioning apparatus as set forth in claim 17, including

    a plurality of projections (62) extending axially circumferentially at intervals on at least one of either the inner or outer periphery of the elastic sleeve (12), an inner or outer periphery of the wedge member (15), the outer periphery of the central pillar (11), or the engaging hole (3).

21. The positioning apparatus as set forth in claim 1, wherein

    said engaging hole (3) is formed as a substantially circular straight hole,  
    an outer peripheral surface (12a) of the engaging member (12) is formed as a  
    substantially circular straight surface.

22. The positioning apparatus as set forth in claim 1, wherein

    said engaging hole (3) is formed as a substantially circular tapered hole which  
    narrows inward,  
    an outer peripheral surface (12a) of the engaging member (12) is formed as a  
    tapered surface which narrows toward the leading end.

23. The positioning apparatus as set forth in claim 1, wherein

    said engaging hole (3) and a clamping hole (81) are provided in the second  
    block (2) inward in the recited order,  
    another engaging member (84), configured to engage with the clamping hole  
    (81), is supported onto the central pillar (11),  
    a rod (87) for engaging the engaging member (84) with the clamping hole (81)  
    and pulling the engaging member (84) toward the base end is inserted into a cylindrical  
    hole (85) of the central pillar (11), and  
    said rod (87) is connected to a clamp driving device (96).

24. The positioning apparatus as set forth in claim 23, wherein

    said first block (1) includes a supply port (97) for a cleaning pressure fluid,

said rod (87) includes a discharge port (98) in a leading end portion thereof,  
    and

    the supply port (97) and the discharge port (98) are communicated with each  
    other.